

REMARKS

In the non-final Office Action, the Examiner objected to the disclosure based on an informality; rejected claims 2-4 under 35 U.S.C. § 112, second paragraph, as allegedly indefinite; and rejected claims 1-27 based on a number of rejections under 35 U.S.C. §§ 102 and 103. More specifically, claims 1-5, 16, 17, 19-21, 23, and 27 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,687,220 to Ayres (“Ayres”); claims 8-14 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent Publication 2002/0099849 to Alfieri et al. (“Alfieri”); claims 1 and 2 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent Publication 2002/0062344 to Ylonen et al. (“Ylonen”); claims 7 and 8 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Ayres; claim 15 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Alfieri; and claims 6, 22, and 24-26 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Ayres in view of Alfieri.

By this Amendment, Applicant has amended the specification to include the serial number and filing date of the application referenced in paragraph [0057] of the application and amended claims 1, 2, 5, 8, 16, and 23 to improve form. Claims 7, 15, and 18 are canceled without prejudice or disclaimer. Claims 1-6, 8-14, 16, 17, and 19-27 are currently pending.

In view of the amendments to the specification and claims, Applicant submits that the objection to the specification and the rejection under 35 U.S.C. § 112, second paragraph, are respectfully obviated. Further, in view of the cancellation of claims 7, 15,

and 18, the rejection of these claims under 35 U.S.C. § 103(a) are also obviated.

*Rejection of claims 1-5, 16, 17, 19-21, 23, and 27
Under 35 U.S.C. § 102(e) Based on Ayres*

Claim 1, as amended, is directed to a routing system that includes a plurality of routing resources including logic resources and physical resources. Additionally, the routing system includes a plurality of virtual routers configured to share the routing resources as a programmably modifiable resource sharing configuration.

Ayres does not disclose or suggest each of the features recited in amended claim 1. Ayres, for example, does not disclose or suggest a plurality of virtual routers configured to share the routing resources in accordance with a programmably modifiable resource sharing configuration. Although Ayres discloses virtual router instances within a single router, Ayres does not disclose that the configuration of the resources for a virtual router are programmably modifiable.

Features related to those now recited in claim 1 were previously included in claim 7 (now canceled). Claim 7 was rejected under 35 U.S.C. § 103(a) based on Ayres. For the purposes of this Amendment, Applicant will assume that the Examiner's rejection of claim 7 would be applied to amended claim 1. In rejecting claim 7, the Examiner concedes that "Ayres discloses all the claim limitations ... except for the shared resources are user programmable." (Office Action, page 8). The Examiner contends, however, that "it would have been obvious to one ordinary skill in the art at the time the invention was made to use software-based machines. The benefit of using user programmable is that

programs can be changed and upgraded and new features are added easily than hardware changes.” (Office Action, page 8). Applicant respectfully disagrees with the Examiner’s conclusion of obviousness.

Amended claim 1 recites more than simply “software-based machines.” Instead, claim 1 is directed to a routing system that includes a plurality of virtual routers. The virtual routers share the resources of the routing system in accordance with a programmably modifiable resource sharing configuration. Whether a router is implemented in hardware, software, or a combination of hardware/software is not particularly relevant to the features recited in claim 1. As described in the pending specification, router “resources” can refer to both logical and physical capabilities of a router. (See Spec., paragraph [0037]).

Ayres is directed to quality of service management in a router having multiple virtual router instances. (Ayres, Title). Although Ayres generally discusses virtual routers, Ayres does not appear to be particularly concerned with how resources are allocated to the virtual routers, much less disclose or suggest virtual routers that share routing resources in accordance with a programmably modifiable resource sharing configuration, as recited in claim 1. Accordingly, Applicant submits that Ayres would not suggest the features recited in claim 1 to one of ordinary skill in the art.

Additionally, Applicant submits that the Examiner has not made a proper *prima facie* case of obviousness. The Examiner’s stated reason for modifying Ayres is not supported by Ayres and in any event, as mentioned above, is not particularly relevant to the features recited in claim 1 relating to virtual routers that share routing resources in

accordance with a programmably modifiable resource sharing configuration.

For at least these reasons, Applicant submits that Ayres does not disclose or suggest each of the features of claim 1. Therefore, the rejection of claim 1 based on Ayres is improper and should be withdrawn. The rejection of claims 2-5 is also improper, at least by virtue of the dependency of these claims from claim 1.

Additionally, claims 2-5 recite additional features that are not disclosed or suggested by Ayres. Claim 5, for example, further defines the shared routing resources recited in claim 1. Specifically, claim 5 recites that the routing resources include routing processes, forwarding processes, control resources, and data resources. Definitions of these resources are given in the pending specification at, for example, paragraphs [0038] through [0041]. As previously mentioned, although Ayres generally discusses virtual routers, Ayres does not appear to be particular concerned with how resources are allocated to the virtual routers, much less that the shared routing resources include the particular resources recited in claim 5.

In rejecting claim 5, the Examiner points to various physical components in the system described by Ayres. (Office Action, page 4). In particular, the Examiner points to the claimed routing processes as being disclosed by element 40 of Ayres and the forwarding processes being disclosed by the CPU of Ayres. Element 40 of Ayres refers to a communication interface. (Ayres, col. 4, lines 62 and 63). A CPU and a communication interface do not disclose or suggest the routing processes and forwarding processes recited in claim 5. As consistently used and defined by the specification, the

routing processes and forwarding processes refer to logical resources of the router. (see Spec., paragraph [0037]).

Accordingly, for at least these reasons also, Applicant submits that these rejection of claim 5 is improper and should be withdrawn.

Independent claim 16 and its dependent claims 17 and 19-21 also stand rejected under 35 U.S.C. § 102(e) based on Ayres. Applicant respectfully traverses this rejection.

Amended claim 16 is directed to a method that includes allocating a first set of resources as shared resources and allocating a second set of resources as non-shared resources. The method further includes implementing a plurality of virtual routers based on a sharing of resources from the first set of resources between the virtual routers and based on independently assigning resources of the second set of resources to each of the virtual routers, wherein the resources included in the first set of resources and the resources included in the second set of resources are user programmable.

Ayres does not disclose or suggest each of the features recited in amended claim 16. Ayres, for example, does not disclose or suggest implementing a plurality of virtual routers based on a sharing of resources from the first set of resources between the virtual routers and based on independently assigning resources of the second set of resources to each of the virtual routers, wherein the resources included in the first set of resources and the resources included in the second set of resources are user programmable.

As previously mentioned, Ayres generally discloses virtual router instances within a single router. Ayres, however, does not disclose sharing of resources using a first set of resources and a second set of resources, as recited in claim 16, where the resources

included in the first set of resources and the resources included in the second set of resources are user programmable.

Features related to those now recited in claim 16 were previously included in claim 18 (now canceled). Claim 18 was rejected under 35 U.S.C. § 103(a) based on Ayres. For the purposes of this Amendment, Applicant will assume that the Examiner's rejection of claim 18 would be applied to amended claim 16. The Examiner's rationale in rejecting claim 18 as being obvious in view of Ayres is identical to that discussed above with respect to claim 7. (see Office Action, page 8). For reasons similar to those given above, Applicant respectfully disagrees with the Examiner's conclusion of obviousness.

More specifically, amended claim 16 recites more than simply "software-based machines." Instead, claim 16 is directed to a method that includes implementing a plurality of virtual routers in the manner specifically recited in claim 16. Ayres, in contrast, does not appear to be particularly concerned with how resources are allocated to virtual routers, much less disclose or suggest virtual routers that share resources in the manner recited in claim 16.

For at least these reasons, Applicant submits that Ayres does not disclose or suggest each of the features of claim 16. Therefore, the rejection of claim 16 based on Ayres is improper and should be withdrawn. The rejection of claims 17 and 19-21 is also improper, at least by virtue of the dependency of these claims from claim 16.

Independent claim 23 and its dependent claim 27 also stand rejected under 35 U.S.C. § 102(e) based on Ayres. Applicant respectfully traverses this rejection.

Claim 23, as amended, is of different scope, but includes certain features similar to those recited in claims 1 and 16. Claim 23, recites, for example, “means for running a plurality of virtual routers that share, based on a user programmable configuration, ones of the means for performing routing processes, the means for performing forwarding processes, the means for implementing control resources, and the means for implementing data resources.” (emphasis added). Based on rationale similar to that given above regarding claims 1 and 16, Applicant submits that Ayres does not disclose or suggest this feature of claim 23.

Accordingly, the rejection of claim 23 is improper and should be withdrawn. The rejection of claim 27 should also be withdrawn, at least by virtue of its dependency on claim 23.

*Rejection of claims 8-14
Under 35 U.S.C. § 102(e) Based on Alfieri*

Claim 8, as amended, is directed to a network point-of-presence (POP) including a physical router system having a plurality of resources; at least one backbone router implemented as a virtual router by the physical router system; and at least one regional router implemented as a virtual router by the physical router system. The backbone virtual router and the regional virtual router share resources of the physical router system. The resources that are shared between the backbone virtual router and the regional virtual router are modifiable by a user.

Alfieri does not disclose or suggest each of the features recited in amended claim 8. Alfieri, for example, does not disclose or suggest a backbone virtual router and a regional virtual router sharing resources of the physical router system, wherein the resources shared between the backbone virtual router and the regional virtual router are modifiable by a user. Features similar to these were previously recited in claim 15. In rejecting claim 15, the Examiner concedes that Alfieri “does not expressly disclose that the resources shared between the backbone virtual router and the regional virtual router are modifiable by a user.” (Office Action, page 9). The Examiner contends, however, that “[i]t would have been obvious to one of ordinary skill in the art at the time the invention was made to use user programmable system. The benefit of using user programmable is that programs can be changed and upgraded and new features are added easily than hardware changes.” (Office Action, page 9).

Alfieri discloses a dense virtual packet switching system including a memory divided into context areas for a set of virtual private routed networks (VPRNs). (Alfieri, Abstract). Alfieri is similar to Ayres in that although Alfieri discloses virtual routers in which the allocation of resources that Alfieri uses to implement the virtual routers appears to be predetermined. Alfieri discloses, for example,

FIG. 5 shows the VR subsystem 54. A collection of routing processes or tasks such as OSPF tasks 60-O, BGP tasks 60-B, and RIP tasks 60-R are coupled to a memory 62 via context selection logic 64. The memory 62 is divided into a number of context areas, shown as CTXT 1, CTXT 2, . . . CTXT M, for M distinct VRs. Each context area contains a routing table and other operating state information for a different VR. The tasks 60 are independent processes that are time-shared among the various VRs. The time-sharing is accomplished in part via the context selection logic 64. As events occur that require action for a given VR (most such events being

associated with the sending and receiving of routing protocol messages or packets), the context selection logic 64 couples the appropriate task 60 to the context area CTXT for that VR. The task 60 then executes using the data from that context area CTXT. This processing continues to completion before a subsequent event is permitted to activate another VR, at which time the same or a different task 60 becomes coupled to a context area CTXT for the other VR.

(Alfieri, paragraph 0036). This section of Alfieri relates to dividing a memory into context areas, in which each context area may contain a routing table. Nothing in this section of Alfieri, however, or any other section of Alfieri, discloses or suggests that the resources that are shared between routers are modifiable by a user, as is recited in claim 8.

Further, Applicant submits that the Examiner has not presented a *prima facie* case of obviousness. Applicant submits that the Examiner's statement of obviousness relating to Alfieri is conclusory and is not supported by Alfieri. Simply because virtual routers exists does not mean or imply that the resources that are shared between the virtual routers are modifiable by a user. In contrast, in Alfieri, how to implement resource sharing between virtual routers appears to be a fixed aspect of the design of Alfieri. In modifying Alfieri, the Examiner appears to be improperly using hindsight gleaned from Applicant's specification.

For at least these reasons, Applicant submits that Alfieri does not disclose or suggest, for example, as is recited in amended claim 8, a backbone virtual router and a regional virtual router that share resources of a physical router system and wherein the resources that are shared between the backbone virtual router and the regional virtual router are modifiable by a user. Thus, the rejection of claim 8 based on Alfieri should be

withdrawn. The rejection of claims 9-14 based on Alfieri should also be withdrawn, at least by virtue of the dependency of these claims on claim 8.

*Rejection of claims 1 and 2
Under 35 U.S.C. § 102(e) Based on Ylonen*

In rejecting claims 1 and 2 based on Ylonen, the Examiner points to Fig. 1b and paragraph [0004] of Ylonen as disclosing multiple virtual routers 110-112 implemented by a processor 116. (Office Action, page 8). Paragraph [0004] of Ylonen states:

Recently, the concept of virtual routers has been introduced, as in FIG. 1b. A virtual router 110, 111 or 112 is a logical concept instead of a physical one. A single physical computing device 113 in a network may house a number of virtual routers that use the same hardware, i.e. the same physical input lines 114 and output lines 115 (which may again physically be the same as the input lines) and the same processor 116. Conceptually the virtual routers are separate entities, and a suitable multiple access scheme is applied to share the common physical resources between them. It is even possible to construct a virtual network where the connections between hosts go through virtual routers. Multiple virtual networks may rely on the same cabling and the same physical routers without having any knowledge of each other. This is a popular way of implementing virtual private networks or VPNs, each of which can serve for example as the backbone network connecting the branch offices of a large company together.

(Ylonen, paragraph [0004]). Neither this section of Ylonen, nor any other section of Ylonen, however, discloses or suggests, as is recited in amended claim 1, a routing system comprising a plurality of routing resources and a plurality of virtual routers configured to share the routing resources in accordance with a programmably modifiable resource sharing configuration.

Accordingly, Ylonen does not disclose or suggest each of the features recited in claim 1 and the rejection of this claim should therefore be withdrawn. The rejection of claim 2, at least by virtue of its dependency on claim 1, should also be withdrawn.

*Rejection of claims 6, 22, and 24-26
Under 35 U.S.C. § 103(a) Based on Ayres and Alfieri*

In rejecting dependent claims 6, 22, and 24-26, the Examiner relies on Alfieri in combination with Ayres. Applicant submits that Alfieri does not cure the above-noted deficiency of Ayres regarding independent claims 1, 16, or 23, respectively. Thus, Ayres and Alfieri, either alone or in combination, do not disclose or suggest each of the features recited in claims 6, 22, and 24-26. Accordingly, the rejection of claims 6, 22, and 24-26 based on Ayres and Alfieri is improper and should be withdrawn.

Conclusion

In view of the foregoing amendments and remarks, Applicant respectfully requests the Examiner's reconsideration of this application, and the timely allowance of the pending claims.

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 07-2347 and please credit any excess fees to such deposit account.

Respectfully submitted,

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